

A description of a palatal portion of a skull from the Loup Fork Miocene deposits of Nebraska, named *Amphicyon americanus*, which is undoubtedly to be referred to the European genus. All the Amphicyons of the American Tertiary hitherto described belong to genera quite different and distinct from the typical genus *Amphicyon* of Europe.—Studies in the Cyperaceæ, by T. Holm. *Carices (Vigneæ) astrostachyæ*.—A just intonation piano, by S. A. Hageman. A description of a piano mechanism for giving just intonation as opposed to equal temperament.—Very on atmospheric radiation, by W. Hallock.

Annalen der Physik, February.—The electromagnetic rotation experiment and unipolar induction, by E. Hagenbach. Lecher has described some results which have led him to regard the usual text-book explanations of many rotation experiments as fallacious. The experimental results here given are in complete accordance with the values calculated from the Biot-Savart laws, and, in fact, the fundamental experiment of Lecher furnishes an additional proof of their accuracy.—On the law of radiation of black substances, by F. Paschen. A comparison of the theories of Planck and Wein with experiment.—A new determination of the dispersion of fluorspar in the ultra-red, by F. Paschen.—The determination of the selective capacity for reflection of a plane mirror, by F. Paschen.—On the behaviour of liquid dielectrics on the passage of an electric current, by E. v. Schweidler. The results obtained show that the analogy between the behaviour of ionised gases and liquid dielectrics is not an accidental one, but is based upon the phenomena of discharge.—On the testing of the magnetic properties of steel, by I. Klemencic.—Determination of the frequency of an alternating current, by R. Wachsmuth. The method described, which is very convenient for vibrations between 1 and 100 per second, ceases to be of service when the number rises above 150.—On the temperature in Geissler's tubes, by K. Kerkhof. The temperature in the capillary tube of a Geissler tube was measured by means of the change of resistance of a fine platinum wire. The results were not in agreement with Wiedemann's law, that the temperature is inversely proportional to the section of the tube.—Magnetic images, by H. Jaeger.—The experimental determination of the capillary constants of condensed gases, by L. Grunmach. The method used is based upon the production of capillary waves by the prongs of a tuning fork and the application of a formula developed by Lord Kelvin. It had been found previously to yield satisfactory results with ordinary liquids and molten metals, and has worked well with liquefied gases. Results are given for sulphur dioxide, ammonia, Pictet's liquid and chlorine. The application of the formula of Ramsay and Shields to these observations proves that there is no association of the molecules in liquid ammonia and sulphur dioxide. In the case of chlorine there appears to be a certain amount of association.—The motion of an electrified particle in an electrostatic field, by E. Riecke.—On stratification in a stream of electrified particles, by E. Riecke.—On the ionisation of electrified gases and the unipolar discharge in glowing bodies, by J. Stark.—On the thermoelectrical behaviour of some oxides and metallic sulphides, by E. van Aubel. The results do not confirm the researches of Abt on the same subject.—On the molecular heat of compound bodies and the Neumann-Joule-Kopp law, by E. van Aubel.—On the theory of radiation. A reply to the criticism of Planck, by W. Wien.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, February 28.—“On the Structure and Affinities of Fossil Plants from the Palæozoic Rocks. IV. The Seed-like Fructification of *Lepidocarpon*, a Genus of Lycopodiaceæ Cones from the Carboniferous Formation.” By D. H. Scott, M.A., Ph.D., F.R.S., Hon. Keeper of the Jodrell Laboratory, Royal Gardens, Kew.

A short account of the new genus *Lepidocarpon* has been given in a note communicated to the Royal Society last August¹; the present paper contains a full, illustrated description of the fossils in question, together with a discussion of their morphology and affinities.

The strobilus of *Lepidocarpon lomaxi*, the Coal-measure species, is, in its earlier condition, in all respects that of a *Lepidostrobus*, of the type of *L. Oldhamius*.

¹ “Note on the Occurrence of a Seed-like Fructification in certain Palæozoic Lycopods,” *Roy. Soc. Proc.*, vol. lxvii. p. 305.

In each megasporangium, however, a single megaspore or embryo sac alone came to perfection, filling almost the whole sporangial cavity, but accompanied by the remains of its abortive sister-cells. An integument ultimately grew up from the sporophyll, completely enclosing the megasporangium, and leaving only a narrow slit-like opening, or micropyle, along the top. As shown in specially favourable specimens, both of *Lepidocarpon lomaxi* and of *L. Wildianum*, the more ancient Burntisland form, the functional megaspore became filled by a large-celled prothallus, resembling that of the recent *Isoetes* or *Selaginella*. The whole body, consisting of the sporophyll, bearing the integumented megasporangium and its contents, became detached from the strobilus, and in this isolated condition is identical with the “seed” described by Williamson under the name of *Cardiocarpon anomalum*, which, however, proves to be totally distinct from the Cordaitan seed so named by Carruthers.

The seed-like organs of *Lepidocarpon* are regarded by the author as presenting close analogies with true seeds, but as differing too widely from the seeds of any known Spermatophyta to afford any proof of affinity. The case appears rather to be one of parallel or convergent development, and not to indicate any genetic connection between the Lycopods and the Gymnosperms, or other Phanerogams.

“On the Theory of Consistence of Logical Class-frequencies and its Geometrical Representation.” By G. Udny Yule, formerly Assistant Professor of Applied Mathematics in University College, London. Communicated by Prof. K. Pearson, F.R.S.

Geological Society, February 20.—J. J. H. Teall, F.R.S., president, in the chair.—Prof. J. B. Harrison, alluding to a series of views of parts of the interior of British Guiana, which he laid on the table, remarked that the photographs had been taken by his colleague, Mr. H. I. Perkins, Acting Commissioner of Mines in British Guiana, during their recent geological investigations into the structure of the goldfields of that colony. The views well illustrate the general characteristics of the densely wooded country in which the gold-bearing areas occur, and give some idea of the difficulties which affect the work of the mining prospector and of the field-geologist in that colony. Several of the photographs illustrate rapids, cataracts and falls which so frequently occur along the courses of some of the vast rivers of that part of South America, and show the differing forms of weathering of various igneous rocks and of horizontally bedded sandstones and conglomerates in the tropics. With reference to a few rock-specimens exhibited, Prof. Harrison stated that they were of diamond-drill cores from the Omai Creek claims on the Essequibo River, and that they fairly represented the principal auriferous rocks of that district. Omai Creek is a small stream flowing into the Essequibo at about 130 miles above its mouth, and the country through which it flows is usually diabase (dolerite) and its decomposition-products. From a part of the bed of one of the tributaries of this stream (Gilt Creek), about 500 feet in length by 50 in breadth, some 60,000 ounces of gold and some hundreds of small diamonds have been recovered by the somewhat crude methods of working hitherto in use.—Prof. Edward Hull made a communication, illustrated by lantern slides, on the submerged valley opposite the mouth of the River Congo. The position of this submerged valley has been ascertained by Mr. Edward Stallybrass and Prof. Hull by contouring the floor of the ocean with the aid of the soundings recorded on the Admiralty charts. The sides of the valley are steep and precipitous and clearly defined, the width varying from two to ten miles, and the length across the continental platform being about 122 miles. It is continuous with the valley of the Congo, and its slope is uninterruptedly downward in the direction of the abyssal floor. The steepness of the sides indicates that they are formed of very solid rocks. Several other submerged valleys off the coast of Western Europe were described for comparison. In most cases the landward end of the submerged river-channel is filled with silt, &c., for some distance from the mouth of the actual river; but farther out its course becomes quite distinct towards its embouchure at the edge of the continental platform. Among the valleys specified were those off the mouth of the Tagus and the Lima, the Adour and the Loire, and those in the English and Irish Channels. The following communication was read:—The geological succession of the beds below the Millstone Grit series of Pendle Hill and their equivalents in certain other parts of England, by Dr. Wheelton Hind and J. Allen Howe. Part i. of this paper

consists of a detailed account of the ground. By various sections the extent of the deposit is shown, and it is demonstrated that the deposit occupies a basin, of which the Pendle district occupies the maximum area of deposit, for the sequence thins out rapidly north-west and south. But although the beds thin out, a calcareous series with a typical zonal fauna is always present. Beds containing this fauna are traced from County Dublin, the Isle of Man, Bolland, Craven, the Calder and Mersey valleys, to Derbyshire and North Staffordshire. It is shown that this series, for which the term Pendleside Series is proposed, occupies a basin about the size of the area indicated above, and that the beds are lithologically distinct from the Yoredale Beds of Wensleydale, and contain a different fauna. Part ii. discusses the question in detail, from a palaeontological point of view. The migration of certain families of fossils from the north to the south, brought about by a slow change of environment, is shown by tables, and lines called "isodietic lines" are drawn to represent this distribution. It is shown that the Nuculidae are found in the lowest Carboniferous beds in Scotland, but come in at successively higher horizons as the beds range southward. These facts and comparative thicknesses are the basis of an argument as to the local distribution of land and water in Carboniferous times; and it is shown that the peculiar change in type which Carboniferous rocks undergo in passing from north to south is due entirely to physiographical conditions, and not to any theoretical assumption of contemporaneous faulting. It is shown, moreover, that the Craven Faults *per se* have had nothing to do with this change of type. The correlation of the limestone-knolls of Craven with the Pendleside Limestone is demonstrated to be no longer tenable.

Zoological Society, March 5.—Dr. W. T. Blandford, F.R.S., vice-president, in the chair.—Mr. Sclater exhibited, on behalf of Captain Stanley Flower, photographs of a young female giraffe, a young male white oryx (*Oryx leucoryx*), and a male ostrich, with the vocal sac extended, which had been taken from examples living in the Zoological Garden at Ghizeh, Egypt.—There were exhibited, on behalf of Dr. Einar Lönnberg, two photographs of a skull of the musk-ox from East Greenland.—Dr. Smith Woodward read a paper on some remains of extinct reptiles obtained from Patagonia by the La Plata Museum. They included the skull and other remains of a remarkably armoured Chelonian, *Miolania*, which had previously been discovered only in superficial deposits in Queensland and in Lord Howe's Island, off the Australian coast. The genus was now proved to be Pleurodiran. There was also a considerable portion of the skeleton of a large extinct snake, apparently of the primitive genus of the South American family Ilysiidae. Along with these remains were found the well-preserved jaws of a large carnivorous Dinosaur, allied to *Megalosaurus*. Either the dinosaurian reptiles must have survived to a later period in South America than elsewhere, or geologists must have been mistaken as to the age of the formation in which the other reptiles and extinct mammals occurred. The discovery of *Miolania* in South America seemed to favour the theory of a former Antarctic continent; but it should be remembered that in late Secondary and early Tertiary times the Pleurodiran Chelonians were almost cosmopolitan. Future discovery might thus perhaps explain the occurrence of *Miolania* in South America and Australia, in the same manner as the occurrence of *Ceratodus* in these two regions was already explained.—Mr. R. I. Pocock read a paper containing descriptions of six new species of trap-door spiders from China. One of these, *Haloproctus ricketti*, was remarkable as constituting a new genus of a specialised group of Ctenizidae, hitherto known only from the Sonoran area of North America. Another, *Latouchia fossoria*, also a new genus, was a more typical Ctenizoid.—Mr. R. H. Burne read a paper on the innervation of the supraorbital canal in the sea-cat (*Chimaera monstrosa*).—Mr. F. E. Beddard, F.R.S., read descriptions of certain new or little-known earthworms belonging to the genera *Polytoreutus* and *Typhocus*. Mr. Beddard also described the clitellum and spermatophores in the annelid *Alma stuhlmanni*.

EDINBURGH.

Royal Society, February 18.—Prof. Geikie in the chair.—Dr. Peddie communicated a paper by the late Mr. Shand and himself on the thermoelectric position of solid mercury. The thermoelectric line was found to be nearly parallel to that of iron and to meet the line of copper very near the temperature of -50°C .—Mr. Thomas Heath read a paper on

observations of the Edinburgh rock thermometers, in which the observations both of the old and the new sets were fully discussed. There was some doubt about the corrections to be applied to the new set; but treating them in the same way as the old set which had been installed by Prof. Forbes in 1837, but had been broken in 1876 by a madman, Mr. Heath found that the results were fairly consistent. There was evidence of change of conductivity with depth, and the values of the conductivity deduced by him from the harmonic analysis were somewhat smaller than the values deduced by Forbes and Everett from the older observations. The new thermometers, however, had been steadily sinking in position since they had been installed in 1879.

March 4.—Sir Arthur Mitchell in the chair.—Prof. Letts and Mr. J. Hawthorne communicated a paper on the seaweed *Ulva Latissima* and its relation to the pollution of sea water by sewage, in which they had investigated with care the manner of fermentation under various conditions. One of the most remarkable facts about this seaweed is the high proportion of nitrogen, distinctly in excess of what is met in other similar plants, in this respect resembling an animal rather than a plant. *Ulva Latissima* is found in great quantity in certain parts of Belfast Lough and Dublin Bay, where the water is strongly polluted by sewage. In similar situations in Stranford Bay, where there was comparatively little sewage, the weed was rarely met with.—Mr. Aitken, in some further notes on the dynamics of cyclones and anticyclones, discussed the relation between storm tracks and the regions of maximum temperature and maximum humidity. Four facts were mentioned as supporting the theory that cyclones were convectionally driven, namely: (1) the circulation in cyclones is principally towards the centre, (2) the velocity increases towards the centre at all levels, (3) storm tracks form and follow with the season change of the areas over which the supply of hot moist air is most plentiful, (4) the greater violence of winds in cyclones than in anticyclones points to some source of energy in cyclonic areas.—Prof. Copeland, the Astronomer Royal for Scotland, gave an account of the observations of the new star in Perseus, discovered by Dr. Anderson. Since the first night of observation the character of the spectrum of the star had changed greatly, being now a faint continuous spectrum crossed with broad, bright lines, flanked on the more refrangible side with dark absorption bands. No evidence of polarisation could be detected in the bright lines. The star was now on the wane, and would probably gradually diminish in brightness until it ceased to be visible to the naked eye. In the after discussion Dr. Knott pointed out how the distribution of the bright and dark bands fell in with the view that the phenomenon was due to a collision taking place mainly in the line of sight, the later stages requiring the relative displacement towards us of gaseous products, cooling by their expansion.

MANCHESTER.

Literary and Philosophical Society, March 5.—Prof. Horace Lamb, F.R.S., president, in the chair.—Mr. C. E. Stromeyer referred to the results of a study of tidal waves which he had published in *NATURE* in 1895, and which indicated that in the majority of cases of which records were available the tidal waves appeared to proceed from the Faraday Reef. Particulars of the tidal wave which recently struck the *Teutonic* are not yet to hand for comparison with former records.—Mr. W. E. Hoyle read a paper entitled "On the genera *Octopus*, *Eledone* and *Histiopsis*," in which he dealt with the nomenclature of these genera.

PARIS.

Academy of Sciences, March 11.—M. Fouqué in the chair.—Utilisation of the points of Collins for the determination of a quadrilateral, by M. Hatt.—On the complete synthesis of acetylpropylene and the terpenic hydrocarbons, by M. Berthelot. Propylene and acetylene, mixed in equal volumes, are heated together to about 500°C . The hydrocarbon C_6H_8 is formed, together with methane.—Remarks on my last communication relating to the telegraphic and telephonic lines established on the snow of Mont Blanc, by M. J. Janssen.—On the waves of the second order, with respect to the velocities which may be presented by a viscous fluid, by M. P. Duhem.—Maltosuria in certain diabetics, by MM. R. Lépine and Bould.—The difference between the rotatory power and the copper-reducing power in the case of certain urines from diabetic patients can be explained by the assumption that maltose is present as well as

glucose.—Remarks by M. Edmond Perrier, on the scientific expeditions of the *Travailleur* and *Talisman*.—M. A. Normand was elected a correspondant for the Section of Geography and Navigation in the place of M. Alexis de Tillo.—Remarks by M. Darboux on the death of M. Th. Moutard.—On the variability of the planet *Eros*, from negatives taken at the Observatory of Toulouse, by M. L. Montangerand (see p. 502).—Note concerning the preceding observations of M. Montangerand, by M. Baillaud.—Complementary details on the new star in Perseus, by M. H. Deslandres. The results of the spectroscopic study of the new star do not confirm the hypothesis tentatively put forward in a previous note. It appears to be necessary to assume the existence of at least two stars, one of which is perhaps a nebula, and which is approaching the other with an enormous velocity.—Observations on the sun made at the Observatory of Lyons with the Brunner 16 cm. equatorial during the fourth quarter of 1900, by M. J. Guillaume. The results are summarised in three tables, giving the number of spots, their distribution in latitude, and the distribution of the faculae in latitude.—On a certain category of transcendental functions, by M. Edmond Maillet.—On the regular quaternary groups of a finite order, by M. Léon Autonne.—On an electrophone giving very loud sounds and on the causes which produce it, by M. Th. Tommasina.—On the reduction of sulphomolybdic acid by alcohol, by M. E. Péchard. Molybdic acid, dissolved in sulphuric acid and gradually reduced by alcohol, gives a blue crystalline deposit of complicated composition, approximately $5\text{NH}_3\text{MoO}_3\text{SO}_3 \cdot 7\text{MoO}_3 + 8\text{H}_2\text{O}$.—A new glycol, 1-4 butane-diol, or tetramethyleneglycol, and its diacetin, by M. J. Hamonet. The diacetin is prepared by the action of silver acetate upon the di-iodobutane, and the glycol is obtained from this by heating with dilute lime-water.—The action of zinc powder upon the saturated fatty acids, by M. A. Hébert. Stearic acid, heated with zinc dust, gives a complicated mixture of olefines, the bromides of which were examined.—The action of mercuric oxide upon some organic compounds, by MM. A. Lumière, L. Lumière and F. Perrin.—On a new preparation of terpinol, by M. P. Genvesse. Pinene, dissolved in alcohol, is treated with nitrous acid, distilled with steam and the product purified by fractional distillation in a vacuum.—New characters of the short electrical stimulus transmitted by the nerve, by M. Aug. Charpentier.—Contribution to the psycho-physiological study of the vital acts in the total absence of the brain in an infant, by MM. N. Vaschide and Cl. Vurpas. The infant, which survived thirty-nine hours, showed a notable lowering of temperature and remarkably slow breathing of the type described by Cheyne and Stokes. The case demonstrated the rôle of the cerebral hemispheres in circulation, respiration and the temperature regulation.—New observations on *Bathynomus*, enormous isopods met with at great depths, by M. E. L. Bouvier.—On the sensibility of the higher plants to very small doses of toxic substances, by M. Henri Coupin. The higher plants, like the fungi, are so sensitive to the toxic action of certain metals, notably silver, mercury, copper and cadmium, that they give evidence of their presence in quantities too small to appreciate by chemical analysis.—Anatomical researches on the ripening of the shoots of the vine, by M. Kövessi. The branches ripen better as the cellular thickness of their walls increases and as their cells contain more starch.—On a fossil insect found in the Trias of Lorraine, by M. P. Fliche.—On the periods of the southern aurora, by M. Henryk Arctowski.—Note relating to a lithological and bathymetric atlas of the coasts of France, by M. J. Thoulet.

DIARY OF SOCIETIES.

THURSDAY, MARCH 21.

ROYAL SOCIETY, at 4.30.—Studies in Visual Sensation (Croonian Lecture): Prof. C. Lloyd Morgan, F.R.S.
LINNEAN SOCIETY, at 8.—On the Internal Tract of Birds, and the Valuation and Nomenclature of Zoological Characters: P. Chalmers Mitchell.
CHEMICAL SOCIETY, at 8.—Researches on Morphine, Part II: S. B. Schryver and F. H. Lees.—The Constitution of Pilocarpine, Part II: H. A. D. Jowett.—Note on the Latent Heats of Evaporation of Liquids: Holland Crompton.—(1) Action of Dry Silver Oxide and Ethyl Iodide on Benzoylactic Ester, Desoxybenzoin, and Benzyl Cyanide; (2) Alkylation of Acylarylamines: G. D. Lander.
CAMERA CLUB, at 8.15.—Yorkshire Caves and Waterfalls: T. C. Hepworth.

FRIDAY, MARCH 22.

ROYAL INSTITUTION, at 9.—Some Recent Work on Diffusion: Dr. Horace Brown, F.R.S.
PHYSICAL SOCIETY (University College, Gower Street), at 5.—On the Expansion of Silica: Prof. Callendar, F.R.S.—The Spectroscopic Apparatus at University College: Dr. E. C. C. Baly.
INSTITUTION OF CIVIL ENGINEERS, at 8.—The Hunslet Railway and Bridge over the River Aire: O. L. McDermott.

SATURDAY, MARCH 23.

ROYAL INSTITUTION, at 3.—Sound and Vibrations: Lord Rayleigh, F.R.S.

MONDAY, MARCH 25.

SOCIETY OF ARTS, at 8.—Electric Railways: Major P. Cardew.
ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—Journeys in the Linyanti Region, South Africa: Percy C. Reid.—Exploration and Survey in the Sobat Region: Major H. H. Austin, R.E.
INSTITUTE OF ACTUARIES, at 5.30.—On the Rates of Mortality in New South Wales and Victoria, and the Construction of a Mortality Table from a single Census and the Deaths in the Years adjacent thereto: E. McMahon Moors and W. R. Day.
CAMERA CLUB, at 8.15.—Colour Photography by the Sanger-Shepherd Process: A. Pringle.

TUESDAY, MARCH 26.

ROYAL INSTITUTION, at 3.—The Cell as the Unit of Life: Dr. A. Macfadyen.
INSTITUTION OF CIVIL ENGINEERS, at 8.—Paper to be further discussed: The Aesthetic Treatment of Bridge Structures: J. Husband.—Paper to be read, time permitting: The Burrator Works for the Water-supply of Plymouth: E. Sandeman.
ROYAL PHOTOGRAPHIC SOCIETY, at 8.—Some Improvements in Optical Projection: J. H. Agar Baugh.

WEDNESDAY, MARCH 27.

SOCIETY OF ARTS, at 8.—Clocks, Carillons and Bells: A. A. Johnston.

THURSDAY, MARCH 28.

ROYAL SOCIETY, at 4.30.—Probable papers: The Growth of Magnetism in Iron under Alternating Magnetic Force: Prof. E. Wilson.—On the Electrical Conductivity of Air and Salt Vapours: Dr. H. A. Wilson.
INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—The Electrical Transmission of Power in Coal Mines: H. W. Ravenshaw.—Portable Electric Lamps: S. F. Walker.
CHEMICAL SOCIETY, at 3.—Annual General Meeting.

FRIDAY, MARCH 29.

ROYAL INSTITUTION, at 9.

SATURDAY, MARCH 30.

ROYAL INSTITUTION, at 3.—Sound and Vibrations: Lord Rayleigh, F.R.S.

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